

### REMARKS

This response is intended as a full and complete response to the Office Action mailed on August 14, 2006. In view of the following amendment and discussion, the Applicants believe that all claims are in allowable form.

### CLAIM REJECTIONS

#### **35 U.S.C. § 112, Claims 1-4, 6-12 and 14-32**

Claims 1-4, 6-12 and 14-32 stand rejected as failing to complying 35 U.S.C. 112, first paragraph. In response, the Applicants have amended claims 1, 19 and 27-28 by replacing the term "metallic film" as "metal containing film" to more clearly certain aspects of the invention. Accordingly, the Applicants respectfully submit that the rejection withdrawn and claims allowed.

#### **35 U.S.C. §103      Claims 1, 3-6, 8-12 and 14**

Claims 1, 3-6, 8-12 and 14 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Tadashi* (Japan 10-324969) in view of *Ngan* (US. Pat. 6,203,674) and *Yamaguchi* (US. Pat. 6,203,674). In response, the Applicants have amended claim 1 to more clearly recite certain aspects of the invention.

Independent claim 1 recites elements not taught or suggested by the combination of *Tadashi*, *Ngan*, and *Yamaguchi*. *Tadashi* teaches supplying argon (Ar) gas into a processing chamber and subsequently applying a power to RF coil and an aluminum target to deposit an aluminum film on the substrate. As a very thin Al film is deposited on the substrate, the electric power supply to the target is terminated. Subsequently, an O<sub>2</sub> or N<sub>2</sub> gas is supplied into the chamber with the plasma generated by the RF coil to oxidize or nitridize the deposited aluminum film. However, *Tadashi* does not teach or suggest introducing a second gas into the chamber to deposit the metal containing film layers, wherein the second gas is introduced proximate a surface of the substrate in the presence of the power applied to the sputter target and the coil, as recited by claim 1.

*Ngan* teaches using a target made by titanium. *Yamaguchi* teaches depositing a TiN film by sputtering a target containing Ti. However, neither *Ngan* nor *Yamaguchi* teaches or suggests introducing a second gas into the chamber to deposit the metal containing film layers, wherein the second gas is introduced proximate a surface of the substrate in the presence of the power applied to the sputter target and the coil, as recited by claim 1. As such, combining the target of *Ngan* and *Yamaguchi* into *Tadashi's* processing chamber would not yield introducing a second gas into the chamber to deposit the metal containing film layers, wherein the second gas is introduced proximate a surface of the substrate in the presence of the power applied to the sputter target and the coil, as recited by claim 1. Therefore, a prima facie case of obviousness has not been established as the references fail to teach or suggest every claimed element.

Thus, the Applicants submit that independent claim 1 and all claims depending therefrom are patentable over the combination of *Tadashi*, *Ngan*, and *Yamaguchi*. Accordingly, the Applicants respectfully request that the rejection be withdrawn and the claims allowed.

### **35 U.S.C. §103      Claim 2**

Claim 2 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over *Tadashi* in view of *Ngan* and *Yamaguchi* and further in view of *Maniv* (US. Pat. 4,392,931). In response, the Applicants have amended claim 1 to more clearly recite certain aspects of the invention.

Independent claim 1, from which claim 2 depends, recites elements not taught or suggested by the combination of *Tadashi*, *Ngan*, *Yamaguchi* and *Maniv*. The teachings of *Tadashi*, *Ngan* and *Yamaguchi* have been discussed above. *Maniv* teaches applying RF energy to a substrate disposed on a substrate support. However, *Maniv* fails to teach or suggest a modification to *Tadashi*, *Ngan* and *Yamaguchi* that would yield introducing a second gas into the chamber to deposit the metal containing film layers, wherein the second gas is introduced proximate a surface of the substrate in the presence of the power applied to the sputter target and the coil, as recited by claim 1.

Thus, the Applicants submit that claim 2, that depends from claim 1, is patentable over the combination of *Tadashi*, *Ngan*, *Yamaguchi* and *Maniv*. Accordingly, the Applicants respectfully request that the rejection be withdrawn and the claim allowed.

**35 U.S.C. §103 Claim 7**

Claim 7 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over *Tadashi* in view of *Ngan* and *Yamaguchi* and further in view of *Lantsman* (US. Pat. 5,830,330). In response, the Applicants have amended claim 1 to more clearly recite certain aspects of the invention.

Independent claim 1, from which claim 7 depends, recites elements not taught or suggested by the combination of *Tadashi*, *Ngan*, *Yamaguchi* and *Lantsman*. The teachings of *Tadashi*, *Ngan* and *Yamaguchi* have been discussed above. *Lantsman* teaches ramping up a power to a target in a processing chamber. However, *Lantsman* fails to teach or suggest a modification to *Tadashi*, *Ngan* and *Yamaguchi* that would yield introducing a second gas into the chamber to deposit the metal containing film layers, wherein the second gas is introduced proximate a surface of the substrate in the presence of the power applied to the sputter target and the coil, as recited by claim 1.

Thus, the Applicants submit that claim 7, that depends from claim 1, is patentable over the combination of *Tadashi*, *Ngan*, *Yamaguchi* and *Lantsman*. Accordingly, the Applicants respectfully request that the rejection be withdrawn and the claim allowed.

**35 U.S.C. §103 Claims 15-16**

Claims 15-16 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Tadashi* in view of *Ngan* and *Yamaguchi* and further in view of *Sone* (US. Pat. 6,451,184). In response, the Applicants have amended claim 1 to more clearly recite certain aspects of the invention.

Independent claim 1, from which claims 15-16 depend, recites elements not taught or suggested by the combination of *Tadashi*, *Ngan*, *Yamaguchi* and *Sone*. The teachings of *Tadashi*, *Ngan* and *Yamaguchi* have been discussed above. *Sone* teaches partitioning a pas space to have reactive gas contained between the partition member and a substrate. However, *Sone* fails to teach or suggest a modification to *Tadashi*,

*Ngan* and *Yamaguchi* that would yield introducing a second gas into the chamber to deposit the metal containing film layers, wherein the second gas is introduced proximate a surface of the substrate in the presence of the power applied to the sputter target and the coil, as recited by claim 1.

Thus, the Applicants submit that claims 15-16, that depends from claim 1, are patentable over the combination of *Tadashi*, *Ngan*, *Yamaguchi* and *Sone*. Accordingly, the Applicants respectfully request that the rejection be withdrawn and the claims allowed.

### **35 U.S.C. §103      Claim 17**

Claim 17 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over *Tadashi* in view of *Ngan* and *Yamaguchi* and further in view of *Gilboa* (US. Pat. 5,108,569). In response, the Applicants have amended claim 1 to more clearly recite certain aspects of the invention.

Independent claim 1, from which claim 17 depends, recites elements not taught or suggested by the combination of *Tadashi*, *Ngan*, *Yamaguchi* and *Gilboa*. The teachings of *Tadashi*, *Ngan* and *Yamaguchi* have been discussed above. *Gilboa* teaches a shield ring disposed in a processing chamber to allow a gas to intrude therefrom. However, *Gilboa* fails to teach or suggest a modification to *Tadashi*, *Ngan* and *Yamaguchi* that would yield introducing a second gas into the chamber to deposit the metal containing film layers, wherein the second gas is introduced proximate a surface of the substrate in the presence of the power applied to the sputter target and the coil, as recited by claim 1.

Thus, the Applicants submit that claim 17, that depends from claim 1, is patentable over the combination of *Tadashi*, *Ngan*, *Yamaguchi* and *Gilboa*. Accordingly, the Applicants respectfully request that the rejection be withdrawn and the claim allowed.

**35 U.S.C. §103      Claim 18**

Claim 18 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over *Tadashi* in view of *Ngan* and *Yamaguchi* and further in view of *Chikako* (Japan 06-041733). In response, the Applicants have amended claim 1 to more clearly recite certain aspects of the invention.

Independent claim 1, from which claim 18 depends, recites elements not taught or suggested by the combination of *Tadashi*, *Ngan*, *Yamaguchi* and *Chikako*. The teachings of *Tadashi*, *Ngan* and *Yamaguchi* have been discussed above. *Chikako* teaches introducing reactive gas through a central portion of a substrate holder disposed in a processing chamber. However, *Chikako* fails to teach or suggest a modification to *Tadashi*, *Ngan* and *Yamaguchi* that would yield introducing a second gas into the chamber to deposit the metal containing film layers, wherein the second gas is introduced proximate a surface of the substrate in the presence of the power applied to the sputter target and the coil, as recited by claim 1.

Thus, the Applicants submit that claim 18, that depends from claim 1, is patentable over the combination of *Tadashi*, *Ngan*, *Yamaguchi* and *Chikako*. Accordingly, the Applicants respectfully request that the rejection be withdrawn and the claim allowed.

**35 U.S.C. §103      Claims 19 and 21**

Claims 19 and 21 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Tadashi* in view of and *Sone* and further in view of *Yamaguchi*. In response, the Applicants have amended claim 19 to more clearly recite certain aspects of the invention.

Independent claim 19 recites elements not taught or suggested by the combination of *Tadashi*, *Sone* and *Yamaguchi*. The teachings of *Tadashi* and *Sone* have been discussed above. *Yamaguchi* teaches depositing a TiN film by sputtering a target containing Ti. However, *Yamaguchi* fails to teach or suggest a modification to *Tadashi* and *Sone* that would yield initiating a plasma within the chamber by applying a power to the sputter target and a coil disposed between the sputtering target and the substrate; and creating a higher partial pressure of an active gas proximate the upper

surface of the substrate than at the sputtering target to deposit metal containing film layers in the presence of the power applied to the sputter target and the coil as recited by claim 19.

Thus, the Applicants submit that independent claim 19, and claim 21 depending therefrom, are patentable over the combination of *Tadashi*, *Sone* and *Yamaguchi*. Accordingly, the Applicants respectfully request that the rejection be withdrawn and the claims allowed.

### **35 U.S.C. §103      Claims 22-23**

Claims 22-23 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Tadashi* in view of and *Sone* and further in view of *Yamaguchi* and further in view of *Maniv*. In response, the Applicants have amended claim 19 to more clearly recite certain aspects of the invention.

Independent claim 19 recites elements not taught or suggested by the combination of *Tadashi*, *Sone*, *Yamaguchi* and *Maniv*. The teachings of *Tadashi*, *Sone* and *Yamaguchi* have been discussed above. *Maniv* teaches applying RF energy to a substrate disposed on a substrate support. However, *Maniv* fails to teach or suggest a modification to *Tadashi*, *Sone* and *Yamaguchi* that would yield initiating a plasma within the chamber by applying a power to the sputter target and a coil disposed between the sputtering target and the substrate; and creating a higher partial pressure of an active gas proximate the upper surface of the substrate than at the sputtering target to deposit metal containing film layers in the presence of the power applied to the sputter target and the coil as recited by claim 19.

Thus, the Applicants submit that claims 22-23, that depends from claim 19, are patentable over the combination of *Tadashi*, *Sone*, *Yamaguchi* and *Maniv*. Accordingly, the Applicants respectfully request that the rejection be withdrawn and the claims allowed.

**35 U.S.C. §103      Claim 27**

Claim 27 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over *Tadashi* in view of and *Sone, Ngan, Maniv* and *Yamaguch*. In response, the Applicants have amended claim 27 to more clearly recite certain aspects of the invention.

Independent claim 27 recites elements not taught or suggested by the combination of *Tadashi, Sone, Ngan, Maniv* and *Yamaguch*. The teachings of *Tadashi, Sone, Ngan, Maniv* and *Yamaguch* have been discussed above. None of these references teaches creating a higher partial pressure of nitrogen proximate the upper surface of the substrate than at the sputtering target to deposit the metal containing film layers in the presence of the power applied to the sputter target and the coil and biasing the coil and the substrate, as recited by claim 27.

Thus, the Applicants submit that independent claim 27 is patentable over the combination of *Tadashi, Sone, Ngan, Maniv* and *Yamaguch*. Accordingly, the Applicants respectfully request that the rejection be withdrawn and the claim allowed.

**35 U.S.C. §103      Claims 28-29**

Claims 28-29 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Tadashi* in view of and *Sone, Takehara* (U. S. Pat., 5,340,459) and *Yamaguch*. In response, the Applicants have amended claim 27 to more clearly recite certain aspects of the invention.

Independent claim 27 recites elements not taught or suggested by the combination of *Tadashi, Sone, Takehara* and *Yamaguch*. The teachings of *Tadashi, Sone* and *Yamaguch* have been discussed above. *Takehara* teaches a pipe adapted to introduce gas into a processing chamber near a substrate. However, *Takehara* fails to teach or suggest a modification to *Tadashi, Sone* and *Yamaguch* that would yield creating a higher partial pressure of nitrogen proximate the upper surface of the substrate than at the sputtering target to deposit the metal containing film layers in the presence of the power applied to the sputter target and the coil and biasing the coil and the substrate, as recited by claim 27.

Thus, the Applicants submit that claims 28-29, that depend from claim 19, are patentable over the combination of *Tadashi*, *Sone*, *Takehara* and *Yamaguch*. Accordingly, the Applicants respectfully request that the rejection be withdrawn and the claims allowed.

### **35 U.S.C. §103      Claim 30**

Claim 30 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Tadashi* in view of and *Sone*, *Takehara* and *Yamaguch* and further in view of *Maniv*. In response, the Applicants have amended claim 27 to more clearly recite certain aspects of the invention.

Independent claim 27 recites elements not taught or suggested by the combination of *Tadashi*, *Sone*, *Takehara* and *Yamaguch* and *Maniv*. The teachings of *Tadashi*, *Sone*, *Takehara* and *Yamaguch* and *Maniv* have been discussed above. None of these references teaches creating a higher partial pressure of nitrogen proximate the upper surface of the substrate than at the sputtering target to deposit the metal containing film layers in the presence of the power applied to the sputter target and the coil and biasing the coil and the substrate, as recited by claim 27.

Thus, the Applicants submit that claim 30, that depends from claim 27, is patentable over the combination of *Tadashi*, *Sone*, *Takehara* and *Yamaguch* and *Maniv*. Accordingly, the Applicants respectfully request that the rejection be withdrawn and the claims allowed.

### **CONCLUSION**

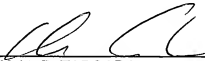
Thus, for at least the reasons discussed above, the Applicants submit that all claims now pending are in condition for allowance. Accordingly, both reconsideration of this application and swift passage to issue are earnestly solicited.



If the Examiner believes that any unresolved issues still exist, it is requested that the Examiner telephone Keith Taboada at (732) 530-9404 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,

Nov 13, 2006  
Date

  
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